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# NASA Procedural Requirements

**COMPLIANCE IS MANDATORY****NPR 8715.7**

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 (NASA Only)

## Subject: Expendable Launch Vehicle Payload Safety Program

**Responsible Office: Office of Safety and Mission Assurance**[| TOC](#) | [Preface](#) | [Chapter1](#) | [Chapter2](#) | [AppendixA](#) | [AppendixB](#) | [AppendixC](#) | [ALL](#) |

## Appendix A. Definitions

A.1 Approving authority(ies). The organization(s) (internal and/or external to NASA) having the responsibility to grant approval/concurrence to perform processing and/or launch activities in their respective facilities, including acceptance of any associated risk.

A.2 Assessment. Review or audit process, using predetermined methods, that evaluates hardware, software, procedures, technical and programmatic documents, and the adequacy of their implementation.

A.3 Audit. A formal review to assess compliance with hardware or software requirements, specifications, baselines, safety standards, procedures, instructions, codes, and contractual and licensing requirements.

A.4 ELV Payload Safety "Agency Team". An agency group appointed by the Chief, Safety and Mission Assurance that performs as an element of the NASA OSMA and provides guidance to the NASA Chief, Safety and Mission Assurance, the NASA ELV Payload Safety Manager, and NASA ELV payload projects. The Agency Team works with the Payload Safety Working Group to resolve any safety concerns associated with a project. The Agency Team also works to ensure that NASA ELV payload safety policy and requirements are adequate and consistently implemented throughout the Agency.

A.5 ELV Payload Safety Manager. A position appointed by the Chief, Safety and Mission Assurance that leads the ELV Payload Safety Program, ensuring Agency policy, requirements, and processes are developed, maintained, and implemented to safeguard people and resources from hazards associated with payload to launch vehicle integration, multiple payloads, and payloads and related GSE. This individual also leads the Agency Team.

A.6 Flight Hardware. Hardware designed and fabricated for ultimate use in a vehicle intended to fly.

A.7 Ground Support Equipment. Ground-based equipment used to store, transport, handle, test, check out, service, and control aircraft, launch vehicles, spacecraft, or payloads.

A.8 Hazard. A state or a set of conditions, internal or external to a system, that has the potential to cause harm.

A.9 Hazard Analysis. Identification and evaluation of existing and potential hazards and the recommended mitigation for the hazard sources found.

A.10 Hazard Control. Means of reducing the risk of exposure to a hazard.

A.11 Hazardous Material. Defined by law as "a substance or materials in a quantity and form which may pose an unreasonable risk to health and safety or property when transported in commerce" (49 U.S.C S 5102, Transportation of Hazardous Materials; Definitions). The Secretary of Transportation has developed a list of materials that are hazardous which may be found in 49 CFR Part 172.101. Typical hazardous materials are those that may be highly reactive, poisonous, explosive, flammable, combustible, corrosive, radioactive, produce contamination or pollution of the environment, or cause adverse health effects or unsafe conditions.

A.12 Hazardous Operation. Any operation involving material or equipment that has a high potential to result in loss of life, serious injury to personnel, or damage to systems, equipment, or facilities.

A.13 Inhibit. Design feature that prevents operation of a function.

A.14 Key Decision Point. (Per NPR 7120.5) An event where the Decision Authority (the Agency's responsible individual who authorizes the transition of a program/project to the next life-cycle phase) determines the readiness of a program/project to progress to the next phase of the life cycle. As such, Key Decision Points serve as gates through which programs and projects must pass.

A.15 Noncompliance. An unsatisfied requirement.

A.16 Operational Safety. That portion of the total NASA safety program dealing with safety of personnel and equipment during launch vehicle ground processing, normal industrial and laboratory operations, use of facilities, special high hazard tests and operations, aviation operations, and use and handling of hazardous materials and chemicals from a safety viewpoint.

A.17 Payload Safety Introduction Briefing. The first meeting of a payload project's PSWG where the Payload Organization briefs the payload to the safety community. This meeting is also referred to as the Concept Briefing with respect to AFSPCMAN 91-710, Range Safety User Requirements.

A.18 Payload Safety Working Group. A working group formed for each NASA ELV payload with a primary purpose to ensure (1) a project's compliance with applicable safety requirements and (2) that the safety risk is identified, understood, and adequately controlled (see paragraph 2.2 of this NPR).

A.19 Programs. For the purposes of this NPR, the term "programs" shall be interpreted to include programs, projects, and acquisitions.

A.20 Projects. For the purposes of this NPR, the term "projects" shall be interpreted to be an ELV payload mission having defined requirements, a life cycle, a beginning, and an end. A project also has a management structure and may interface with other projects, agencies, and international partners. A project yields new or revised products that directly address NASA's strategic needs.

A.21 Range Safety. Application of safety policies, principles, and techniques to ensure the control and containment of flight vehicles to preclude an impact of the vehicle or its pieces outside of predetermined boundaries from an abort which could endanger life or cause property damage. Where the launch range has jurisdiction, prelaunch preparation is included as a safety responsibility. Additionally, the term "Range Safety" is informally used to refer to the organization responsible for implementing/enforcing range safety requirements (e.g., USAF 30th or 45th Space Wings' Safety Offices and the Wallops Flight Facility Safety Office).

A.22 Risk. The combination of (1) the probability (qualitative or quantitative) of experiencing an undesired event, (2) the consequences, impact, or severity that would occur if the undesired event were to occur, and (3) the uncertainties associated with the probability and consequences.

A.23 Risk Management. An organized, systematic decision-making process that efficiently identifies, analyzes, plans, tracks, controls, communicates, and documents risk to increase the likelihood of achieving project goals.

A.24 Risk (Safety) Assessment. Process of qualitative risk categorization or quantitative risk (safety) estimation, followed by the evaluation of risk significance.

A.25 Safety. Freedom from those conditions that can cause death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment. In a risk-informed context, safety is an overall mission and program condition that provides sufficient assurance that accidents will not result from the mission execution or program implementation, or, if they occur, their consequences will be mitigated. This assurance is established by means of the satisfaction of a combination of deterministic criteria and risk criteria.

A.26 Safety Analysis. Generic term for a family of analyses, which includes but is not limited to, preliminary hazard analysis, system (subsystem) hazard analysis, operating hazard analysis, software hazard analysis, sneak circuit, and others.

A.27 Safety Critical. Term describing any condition, event, operation, process, equipment, or system that could cause or lead to severe injury, major damage, or mission failure if performed or built improperly, or allowed to remain uncorrected.

A.28 Safety Data Package. A data submittal that provides a detailed description of hazardous and safety critical flight hardware equipment, systems, components and materials that comprise the payload. Includes hazard reports, safety assessments, inhibits, and mitigations. Known as a Missile System Prelaunch Safety Package (MSPSP) with respect to AFSPCMAN 91-710, Range Safety User Requirements.

A.29 Safety Program. The implementation of a formal comprehensive set of safety procedures, tasks, and activities to meet safety requirements, goals, and objectives.

A.30 System Safety. Application of engineering and management principles, criteria, and techniques to optimize safety and reduce risks within the constraints of operational effectiveness, time, and cost throughout all phases of the

system life cycle.

A.31 System Safety Plan. A written plan defining the approach to accomplish the project safety activities, including safety management, identification of safety tasks, roles and responsibilities, and the coordination and communication with project/systems engineers and approving authorities. It is also known as the Systems Safety Technical Plan as defined in NPR 8715.3, and the Systems Safety Program Plan defined in Air Force Space Command Manual 91-710, Range Safety User Requirements Manual, Volume III, Chapter 4.

A.32 Tailoring. The process of assessing the applicability of requirements and evaluating the project's potential implementation in order to generate a set of specific requirements for the project.

A.33 Waiver. A written authorization granting relief from an applicable requirement and documenting the acceptance of any associated risk. For NASA ELV payload projects, waivers typically are approved for a single mission and have a specific duration. However, a waiver identified early in the design or specification/requirement review(s) may apply throughout the project or to multiple missions that use a common upper stage and/or a common spacecraft bus.

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